WHAT IS CLAIMED IS:

1.   A magnetic therapeutic nanoparticle (MTNP) comprising a plurality of bioactive agents, a core of superparamagnetic material, and a polymeric scaffold encapsulant.

2.   An MTNP according to claim 1 wherein the superparamagnetic material is selected from the iron oxides.

3.   An MTNP according to claim 1 or 2 wherein the polymeric scaffold comprises crosslinked building blocks, at least some of which building blocks are carbohydrate-based monomers or polymers, and at least some of the bioactive agents are bound to the polymeric scaffold by coordination bonds or covalent bonds.

4.   An MTNP according to claim 3 wherein the bioactive agent is a chemotherapeutic agent.

5.   An MTNP according to claim 1 or 2 wherein the polymeric scaffold comprises polycarboxylates, the superparamagnetic material is bound to the polymeric scaffold by coordination bonds, and at least some of the bioactive agents are bound to the polymeric scaffold by coordination bonds.

6.   An MTNP according to claim 5 wherein the bioactive agent comprises platinum.

7.   An MTNP according to any of claims 1 to 6 wherein the polymeric scaffold further comprises one or more functional building blocks selected to introduce a desired characteristic or functionality into the scaffold.

8.   An MTNP according to claim 7 wherein the functional building blocks are selected from the group consisting of N,N'-cystinebisacrylamide (CiBA), sodium acrylate (NaA), N-(3-aminopropyl)methacrylamide hydrochloride (APMA), N[ethylamino]-3-amino-propylmethacrylamide hydrochloride, polyethylene imine (PEI), polylysine, polyamido-acrylamide derivatives, and protamine sulfate, and mixtures thereof.

9.   An MTNP according to any of claims 1 to 8 wherein the building blocks further comprise small molecule crosslinking agents.

10. An MTNP according to 9 wherein the crosslinking agent is comprised of platinum.

11. An MTNP according to any of claims 1 to 10 which further comprises one or more recognition elements covalently attached to the polymeric scaffold, the recognition elements having binding affinity to biomolecular structures expressed on certain cells or in certain tissues.

12. An MTNP according to any of claims 1 to 11 which further comprises at least one polyethylene glycol molecule covalently attached to the polymeric matrix.

13. A method of magnetic resonance image (MRI) enhancement in a subject, the method comprising:

 administering to the subject an effective amount of an MRI contrast agent comprising MTNPs of any of claims 1 to 12; and

 imaging the subject using a magnetic resonance device.

14. A method of purification of MTNPs from reactants, the method comprising:

 applying a permanent magnetic field to a reaction vessel having a solution containing MTNPs of any of claims 1 to 12 and reactants unassociated with the MTNPs; and

 removing the solution with reactants from the reaction vessel;

to give reactant-free MTNPs retained in the reaction vessel.

15. A method of delivering a bioactive agent to an environment, the method comprising:

 administering to the environment a plurality of MTNPs of any of claims 1 to 12; and

 applying to the environment heat sufficient for release of bioactive agent from the MTNPs into the environment.

16. A method according to claim 15 wherein the heat is applied by means of an alternating magnetic field generated external to the environment, with the alternating magnetic field causing the MTNP to heat up and release the bioactive agent from the MTNPs.

17. A method according to claim 15 or 16 comprising, after administering the MTNPs and prior to applying heat, the additional step of concentrating the magnetoarticles in the environment by applying a substantially constant magnetic field to the environment.

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